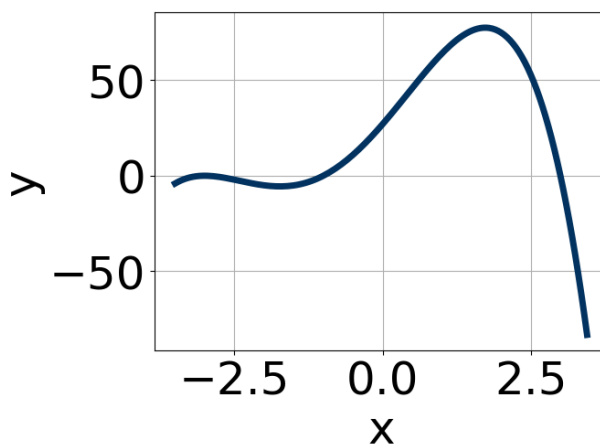


1. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-3 - 2i \text{ and } -3$$

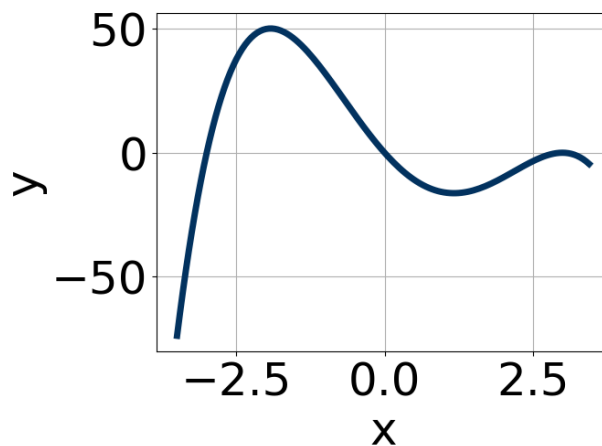
- A. $b \in [-5, 3]$, $c \in [5.4, 6.45]$, and $d \in [7.9, 9.4]$
B. $b \in [-5, 3]$, $c \in [4.58, 5.53]$, and $d \in [1.9, 7.1]$
C. $b \in [2, 13]$, $c \in [30.15, 31.6]$, and $d \in [38.1, 39.8]$
D. $b \in [-17, -6]$, $c \in [30.15, 31.6]$, and $d \in [-42, -38.7]$
E. None of the above.
-

2. Which of the following equations *could* be of the graph presented below?



- A. $-15(x + 3)^{10}(x - 3)^7(x + 1)^{11}$
B. $-9(x + 3)^{11}(x - 3)^8(x + 1)^9$
C. $-7(x + 3)^{10}(x - 3)^6(x + 1)^7$
D. $5(x + 3)^{10}(x - 3)^5(x + 1)^4$
E. $7(x + 3)^6(x - 3)^5(x + 1)^5$
-

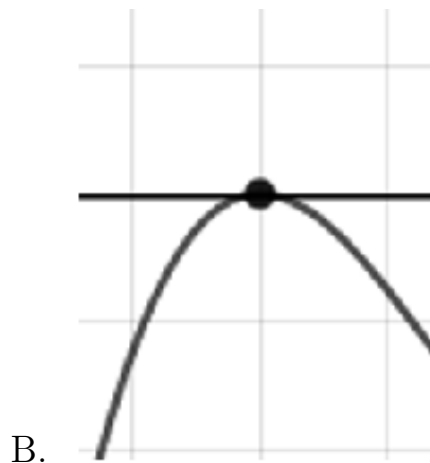
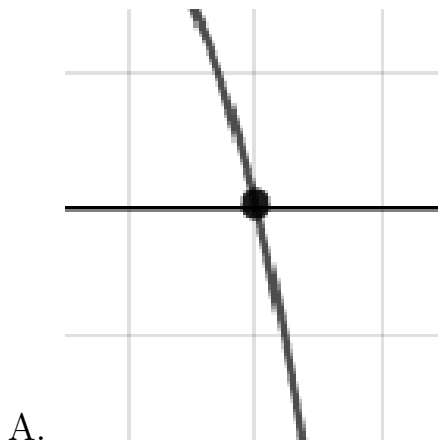
3. Which of the following equations *could* be of the graph presented below?



- A. $10x^7(x-3)^4(x+3)^{10}$
- B. $15x^{11}(x-3)^6(x+3)^5$
- C. $-20x^6(x-3)^9(x+3)^7$
- D. $-7x^7(x-3)^8(x+3)^5$
- E. $-18x^4(x-3)^4(x+3)^5$

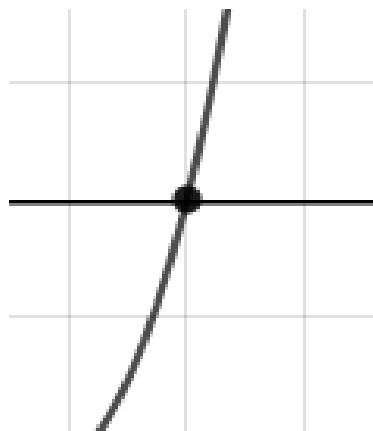
4. Describe the zero behavior of the zero $x = 4$ of the polynomial below.

$$f(x) = 2(x+6)^8(x-6)^4(x-4)^{10}(x+4)^7$$





C.



D.

E. None of the above.

5. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$2 + 3i \text{ and } 3$$

- A. $b \in [4, 11], c \in [21.54, 25.63], \text{ and } d \in [33, 43]$
 B. $b \in [-3, 5], c \in [-5.17, -2.87], \text{ and } d \in [0, 7]$
 C. $b \in [-3, 5], c \in [-6.83, -5.89], \text{ and } d \in [9, 10]$
 D. $b \in [-9, -4], c \in [21.54, 25.63], \text{ and } d \in [-46, -38]$
 E. None of the above.

6. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{3}{5}, \frac{-1}{3}, \text{ and } \frac{-1}{2}$$

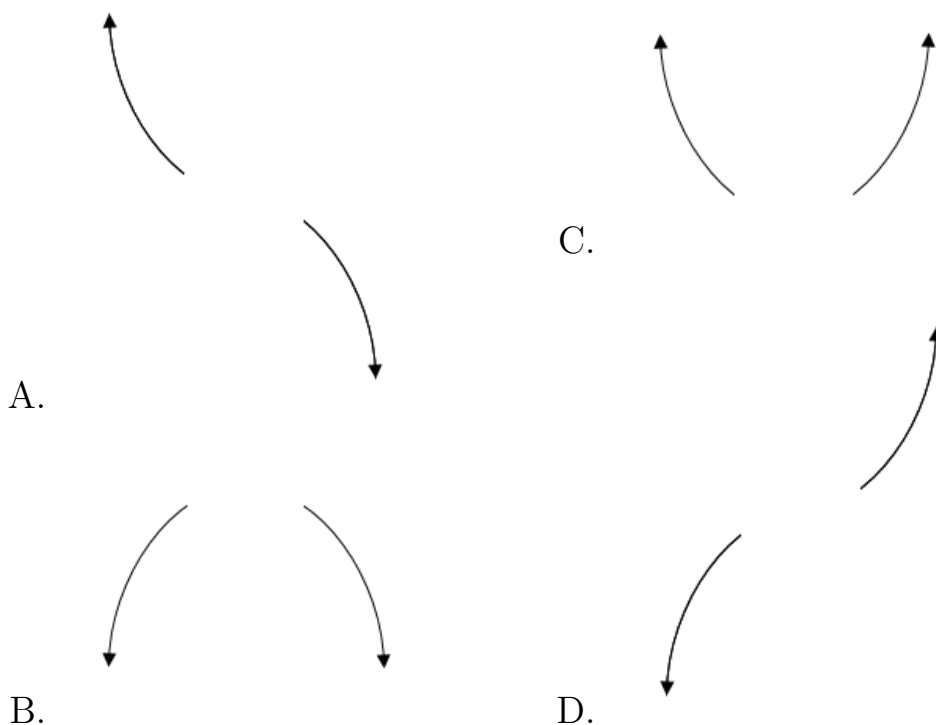
- A. $a \in [30, 39], b \in [-13, -1], c \in [-13, -6], \text{ and } d \in [-1, 7]$
 B. $a \in [30, 39], b \in [40, 44], c \in [18, 24], \text{ and } d \in [-1, 7]$
 C. $a \in [30, 39], b \in [22, 27], c \in [-2, 0], \text{ and } d \in [-3, -2]$

D. $a \in [30, 39], b \in [7, 13], c \in [-13, -6],$ and $d \in [-1, 7]$

E. $a \in [30, 39], b \in [7, 13], c \in [-13, -6],$ and $d \in [-3, -2]$

7. Describe the end behavior of the polynomial below.

$$f(x) = -7(x - 9)^5(x + 9)^8(x + 4)^5(x - 4)^7$$



E. None of the above.

8. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-6}{5}, \frac{3}{5}, \text{ and } \frac{7}{2}$$

A. $a \in [48, 54], b \in [-154, -139], c \in [-141, -135],$ and $d \in [-128, -118]$

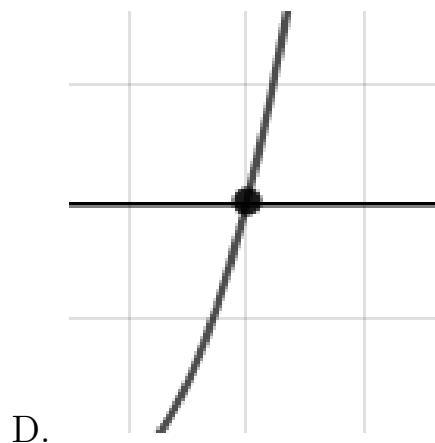
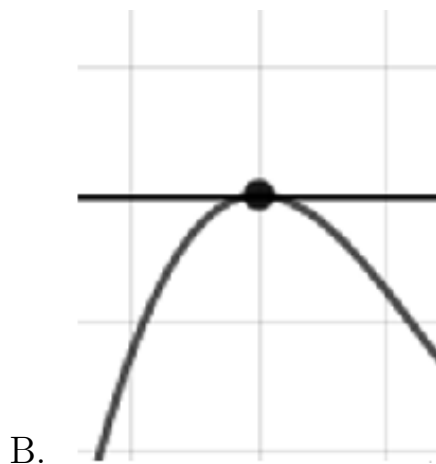
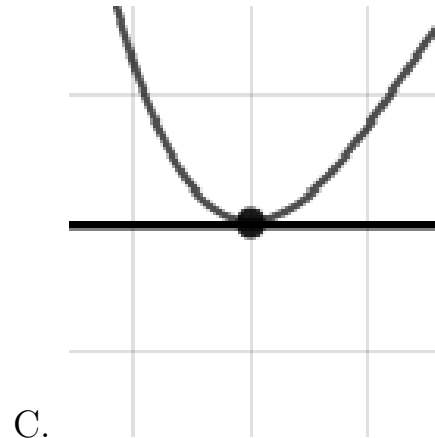
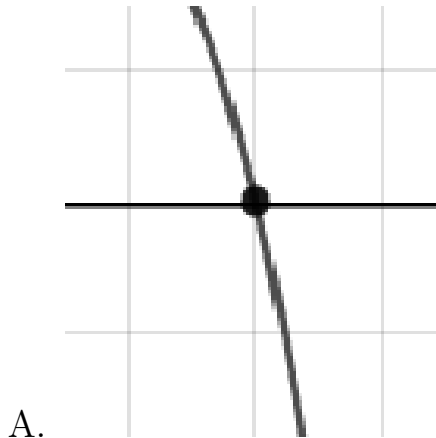
B. $a \in [48, 54], b \in [-206, -201], c \in [67, 73],$ and $d \in [125, 132]$

C. $a \in [48, 54], b \in [-267, -261], c \in [350, 357],$ and $d \in [-128, -118]$

- D. $a \in [48, 54], b \in [142, 152], c \in [-141, -135]$, and $d \in [-128, -118]$
E. $a \in [48, 54], b \in [-154, -139], c \in [-141, -135]$, and $d \in [125, 132]$
-

9. Describe the zero behavior of the zero $x = 5$ of the polynomial below.

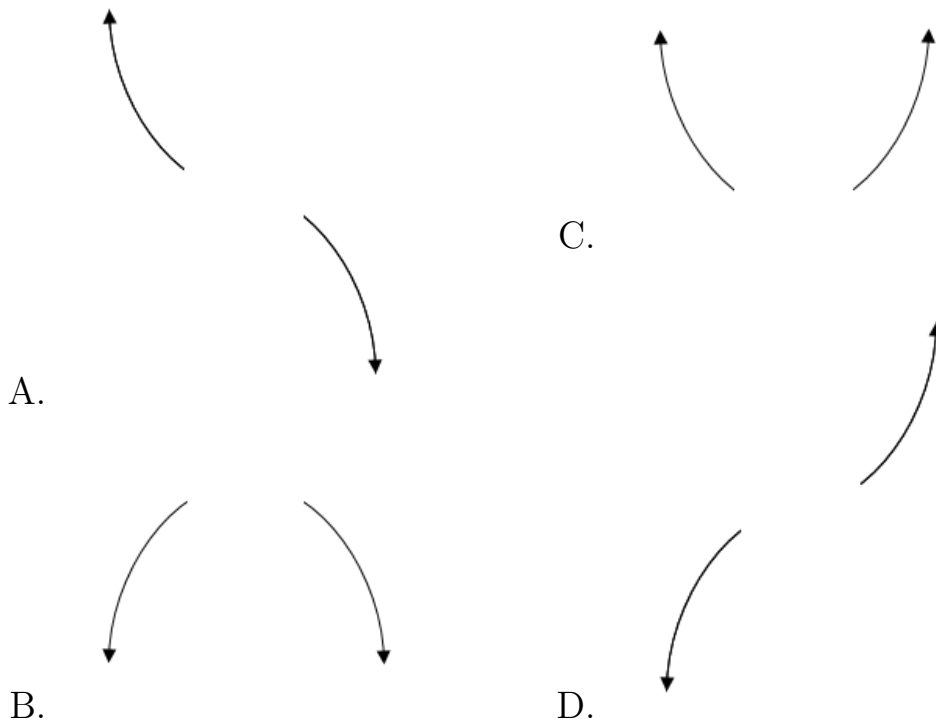
$$f(x) = -7(x - 3)^6(x + 3)^3(x - 5)^{10}(x + 5)^7$$



E. None of the above.

10. Describe the end behavior of the polynomial below.

$$f(x) = -8(x + 3)^4(x - 3)^5(x + 7)^3(x - 7)^5$$



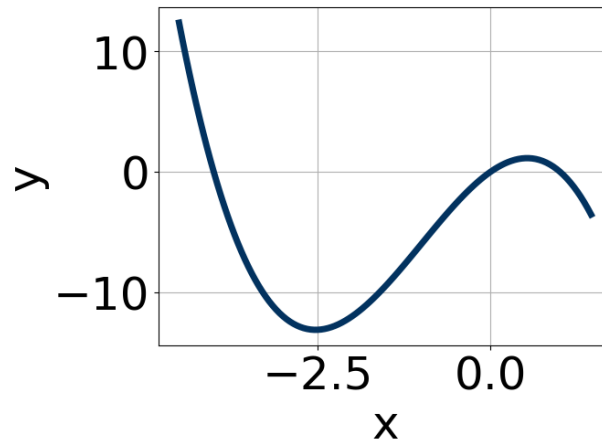
E. None of the above.

11. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-5 + 5i \text{ and } 3$$

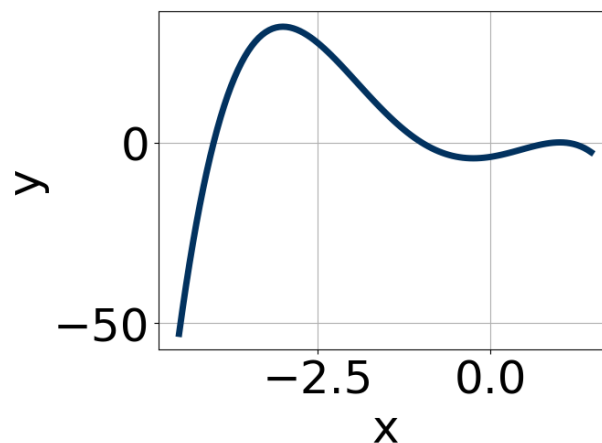
- A. $b \in [-11, -3]$, $c \in [16, 22]$, and $d \in [145, 151]$
- B. $b \in [1, 6]$, $c \in [-1, 7]$, and $d \in [-18, -13]$
- C. $b \in [2, 12]$, $c \in [16, 22]$, and $d \in [-156, -141]$
- D. $b \in [1, 6]$, $c \in [-9, 1]$, and $d \in [13, 20]$
- E. None of the above.

12. Which of the following equations *could* be of the graph presented below?



- A. $-9x^5(x-1)^9(x+4)^9$
- B. $17x^{11}(x-1)^9(x+4)^9$
- C. $6x^5(x-1)^8(x+4)^9$
- D. $-7x^7(x-1)^8(x+4)^4$
- E. $-17x^7(x-1)^{10}(x+4)^9$

13. Which of the following equations *could* be of the graph presented below?

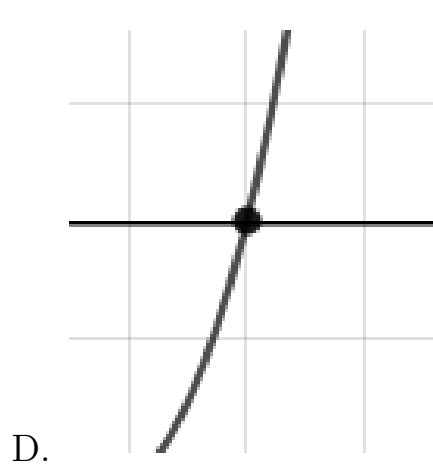
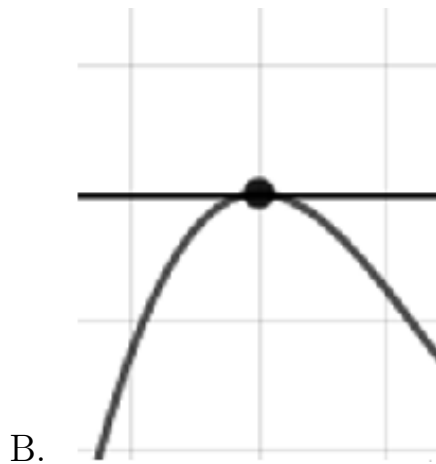
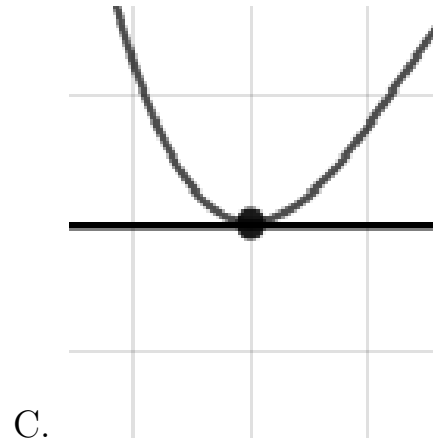
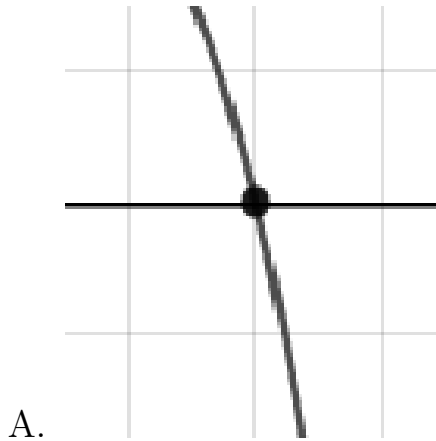


- A. $-17(x-1)^4(x+4)^8(x+1)^9$
- B. $20(x-1)^{10}(x+4)^7(x+1)^4$
- C. $2(x-1)^{10}(x+4)^9(x+1)^9$
- D. $-6(x-1)^7(x+4)^8(x+1)^{11}$

E. $-4(x-1)^{10}(x+4)^7(x+1)^9$

14. Describe the zero behavior of the zero $x = -6$ of the polynomial below.

$$f(x) = -4(x-8)^6(x+8)^2(x+6)^9(x-6)^6$$



E. None of the above.

15. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-4 - 2i \text{ and } -2$$

A. $b \in [8, 13]$, $c \in [34.2, 37]$, and $d \in [40, 42]$

- B. $b \in [-4, 6], c \in [4.5, 8.2]$, and $d \in [6, 9]$
 C. $b \in [-4, 6], c \in [3, 4.3]$, and $d \in [2, 5]$
 D. $b \in [-14, -8], c \in [34.2, 37]$, and $d \in [-40, -32]$
 E. None of the above.

16. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

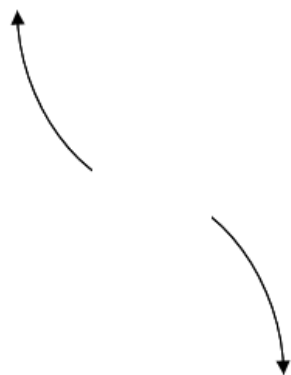
$$\frac{-7}{5}, \frac{5}{2}, \text{ and } \frac{-1}{4}$$

- A. $a \in [35, 41], b \in [48, 58], c \in [-131, -125]$, and $d \in [-42, -32]$
 B. $a \in [35, 41], b \in [-36, -27], c \in [-158, -150]$, and $d \in [33, 37]$
 C. $a \in [35, 41], b \in [-148, -145], c \in [95, 106]$, and $d \in [33, 37]$
 D. $a \in [35, 41], b \in [-36, -27], c \in [-158, -150]$, and $d \in [-42, -32]$
 E. $a \in [35, 41], b \in [32, 40], c \in [-158, -150]$, and $d \in [33, 37]$

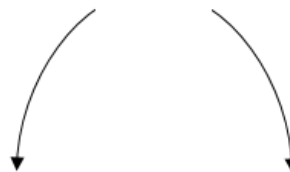
17. Describe the end behavior of the polynomial below.



$$f(x) = 8(x - 4)^4(x + 4)^9(x + 8)^4(x - 8)^5$$

A.



B.



- C. 
- D. 
- E. None of the above.

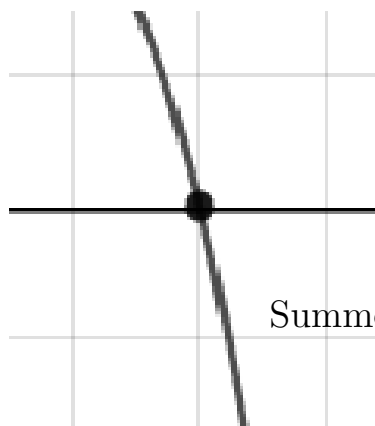
18. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{1}{2}, \frac{7}{4}, \text{ and } 4$$

- A. $a \in [7, 12], b \in [-23, -12], c \in [-71, -59], \text{ and } d \in [-32, -21]$
- B. $a \in [7, 12], b \in [-51, -44], c \in [77, 82], \text{ and } d \in [-32, -21]$
- C. $a \in [7, 12], b \in [49, 55], c \in [77, 82], \text{ and } d \in [28, 30]$
- D. $a \in [7, 12], b \in [-51, -44], c \in [77, 82], \text{ and } d \in [28, 30]$
- E. $a \in [7, 12], b \in [-44, -34], c \in [31, 43], \text{ and } d \in [28, 30]$

19. Describe the zero behavior of the zero $x = 2$ of the polynomial below.

$$f(x) = -4(x - 2)^5(x + 2)^{10}(x - 3)^6(x + 3)^{10}$$



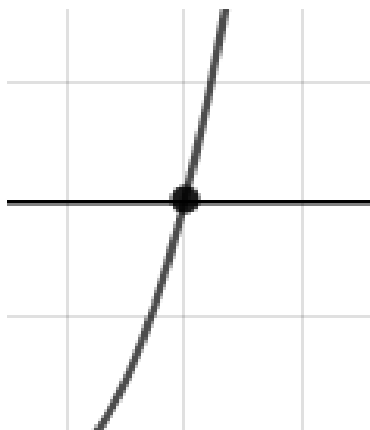
B.



C.



D.

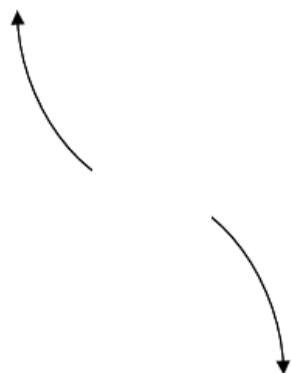


E. None of the above.

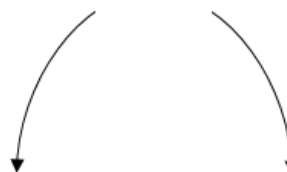
20. Describe the end behavior of the polynomial below.


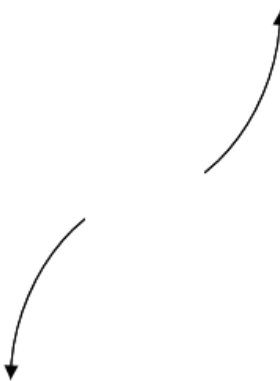
$$f(x) = 2(x + 5)^3(x - 5)^6(x + 3)^3(x - 3)^5$$

A.



B.



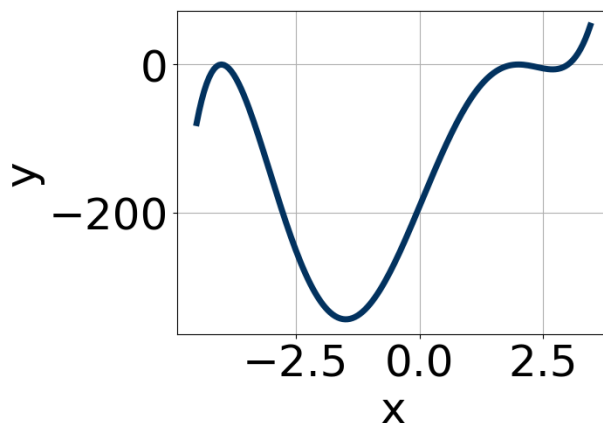
- C. 
- D. 
- E. None of the above.

21. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-2 - 5i \text{ and } 3$$

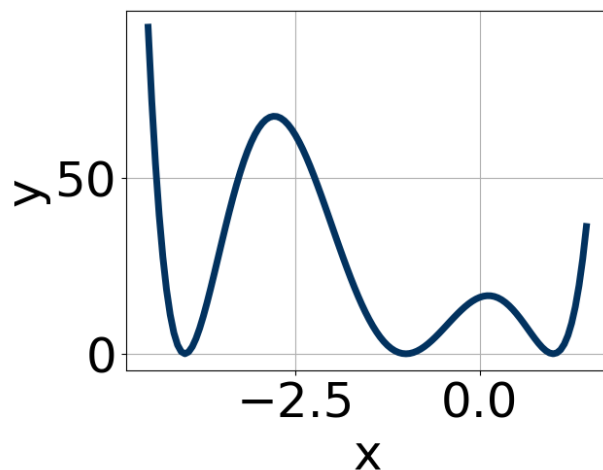
- A. $b \in [-0.9, 3.8], c \in [16, 20.1],$ and $d \in [-91, -82]$
- B. $b \in [-1.5, 0.8], c \in [16, 20.1],$ and $d \in [84, 91]$
- C. $b \in [-0.9, 3.8], c \in [-3.2, -0.5],$ and $d \in [-6, -1]$
- D. $b \in [-0.9, 3.8], c \in [0.2, 7.4],$ and $d \in [-15, -11]$
- E. None of the above.

22. Which of the following equations *could* be of the graph presented below?



- A. $13(x+4)^6(x-2)^5(x-3)^9$
 B. $-18(x+4)^4(x-2)^{10}(x-3)^6$
 C. $8(x+4)^6(x-2)^8(x-3)^9$
 D. $3(x+4)^8(x-2)^9(x-3)^4$
 E. $-8(x+4)^4(x-2)^8(x-3)^5$

23. Which of the following equations *could* be of the graph presented below?

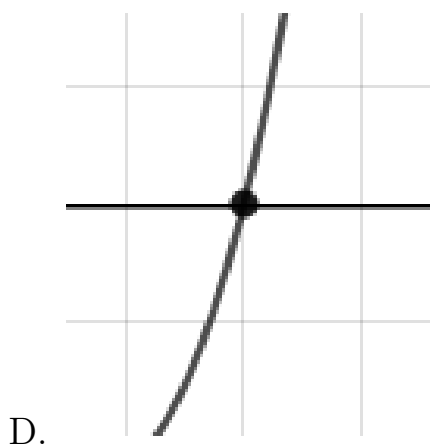
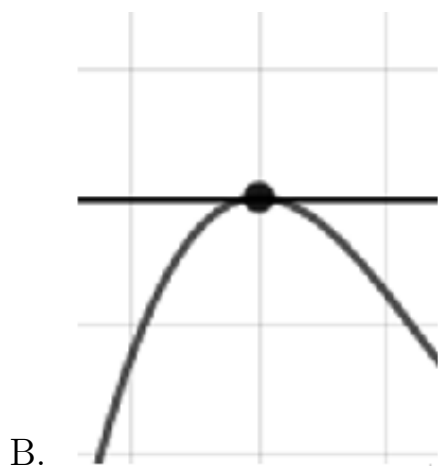
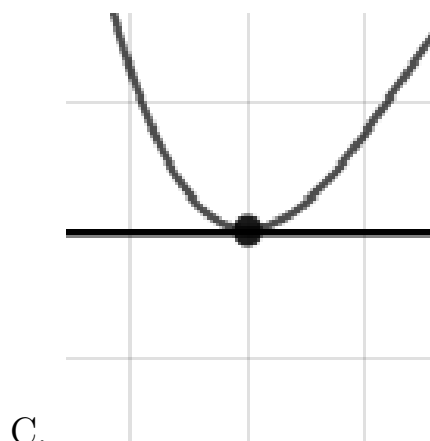
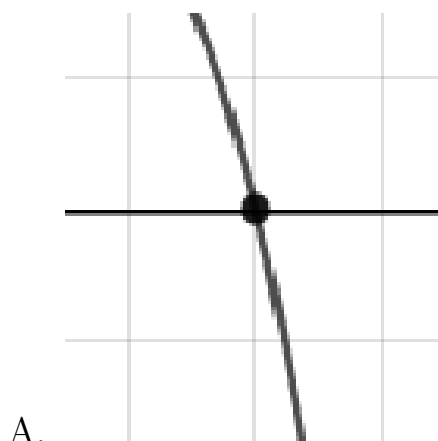


- A. $-18(x+4)^{10}(x+1)^4(x-1)^8$
 B. $20(x+4)^8(x+1)^5(x-1)^7$
 C. $18(x+4)^6(x+1)^4(x-1)^8$
 D. $-4(x+4)^{10}(x+1)^{10}(x-1)^7$

E. $6(x+4)^8(x+1)^4(x-1)^7$

24. Describe the zero behavior of the zero $x = 6$ of the polynomial below.

$$f(x) = -3(x+4)^8(x-4)^5(x+6)^6(x-6)^5$$



E. None of the above.

25. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-2 + 5i \text{ and } 1$$

A. $b \in [2.3, 3.6], c \in [24, 32], \text{ and } d \in [-30, -20]$

- B. $b \in [-1.2, 1.7], c \in [-10, -3]$, and $d \in [0, 12]$
- C. $b \in [-1.2, 1.7], c \in [-1, 13]$, and $d \in [-5, 0]$
- D. $b \in [-5.5, -1.7], c \in [24, 32]$, and $d \in [23, 32]$
- E. None of the above.

26. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

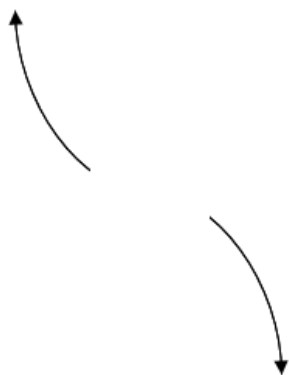
$$2, \frac{1}{5}, \text{ and } -\frac{1}{4}$$

- A. $a \in [17, 29], b \in [-39.3, -36.6], c \in [-5.1, -0.4]$, and $d \in [-4, 0]$
- B. $a \in [17, 29], b \in [47.6, 51.5], c \in [18.7, 20.3]$, and $d \in [2, 8]$
- C. $a \in [17, 29], b \in [-39.3, -36.6], c \in [-5.1, -0.4]$, and $d \in [2, 8]$
- D. $a \in [17, 29], b \in [33.4, 40.5], c \in [-5.1, -0.4]$, and $d \in [-4, 0]$
- E. $a \in [17, 29], b \in [39.7, 41.9], c \in [-2, 2.2]$, and $d \in [-4, 0]$

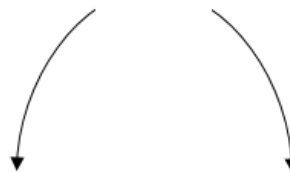
27. Describe the end behavior of the polynomial below.

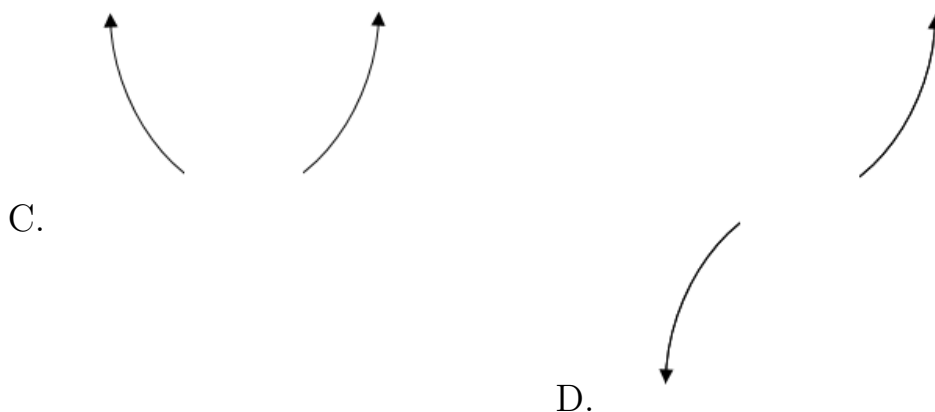
$$f(x) = 5(x - 5)^4(x + 5)^5(x - 6)^5(x + 6)^6$$

A.



B.





E. None of the above.

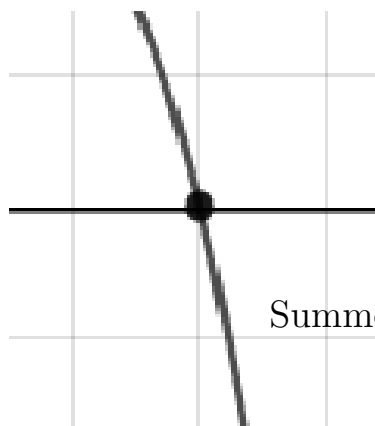
28. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$-5, \frac{-2}{3}, \text{ and } \frac{-7}{5}$$

- A. $a \in [12, 16], b \in [103, 110], c \in [161, 178],$ and $d \in [-74, -62]$
 B. $a \in [12, 16], b \in [-72, -57], c \in [-75, -65],$ and $d \in [68, 74]$
 C. $a \in [12, 16], b \in [-45, -43], c \in [-142, -136],$ and $d \in [-74, -62]$
 D. $a \in [12, 16], b \in [-113, -105], c \in [161, 178],$ and $d \in [-74, -62]$
 E. $a \in [12, 16], b \in [103, 110], c \in [161, 178],$ and $d \in [68, 74]$

29. Describe the zero behavior of the zero $x = -9$ of the polynomial below.

$$f(x) = -9(x - 9)^4(x + 9)^5(x + 3)^9(x - 3)^{10}$$



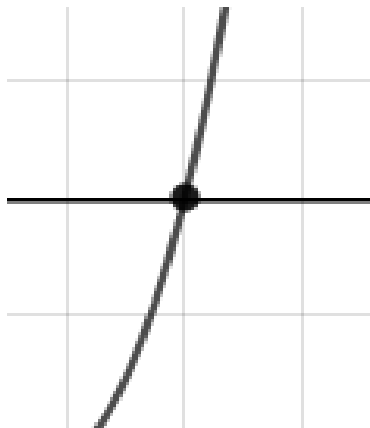
B.



C.



D.

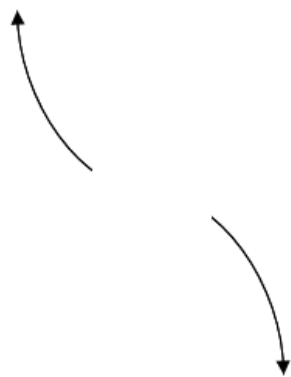


E. None of the above.

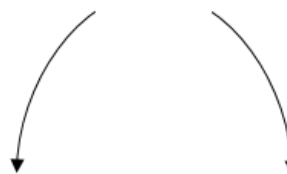
30. Describe the end behavior of the polynomial below.

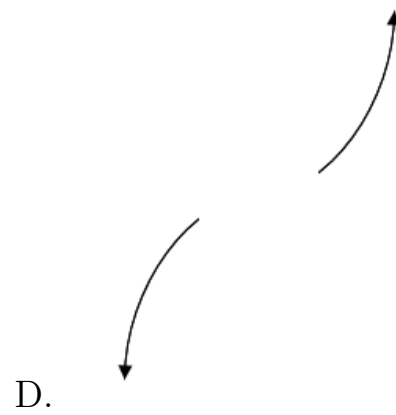
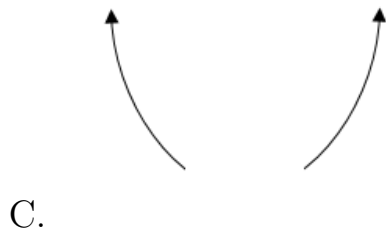
$$f(x) = 5(x - 5)^5(x + 5)^{10}(x - 8)^5(x + 8)^7$$

A.



B.





E. None of the above.
